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(54) **Gaming machine and method of operating such a machine**

(57) In operation of a gaming machine, a payment is made to the machine by a player in order to play a game and payments are at least sometimes made to the player by the machine according to the result of the game, the result being at least partially random. The length of time of the games or parts of the games is monitored and the operation of the machine is altered in accordance with the monitored time. The operation of the machine may also be altered according to the time at which the machine is being operated.

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Gaming Machine and Method of Operating
such a Machine

This invention relates to a gaming machine, for example a fruit machine, in which a payment is made to the machine by a player in order to play a game and in which payments are at least sometimes made to the player by the machine according to the result of the game which result is at least partially random. The invention also relates to a method of operating such a machine.

Such machines are usually arranged such that the amount paid into the machine exceeds the amount paid out by the machine in the long term. Nonetheless, because of the at least partially random nature of the result of any game the short term relationship between the amount paid into the machine and the amount paid out by the machine is liable to vary considerably unless special measures are taken. Accordingly it has been proposed, for example in GB 1 454 046, to alter the operation of the machine in order to adjust the chance of a player receiving a payment from the machine and maintain a steady take (take being defined as the difference between the payments made into the machine and from the machine) over a given number of games.

Gaming machines have not however taken into account the length of time that a player may take to play a game. For some years gaming machines have been

available having a variety of sophisticated extra facilities which may be used by a player and which may significantly affect the time taken for a single game to be played. The significance of this variation in time
5 has not been fully appreciated. If for example one player plays a machine 20 per cent faster than another then if the take per game of the machine is maintained constant, the take per hour, which is likely to be more significant to the owner of the machine, will be 20 per
10 cent higher in the case of the faster player.

It is an object of the invention to provide a gaming machine which takes account of the rate of playing games on the machine.

According to a first aspect of the invention
15 there is provided a method of operating a gaming machine in which payments are made to the machine by a player in order to play games and in which payments are at least sometimes made to the player by the machine according to the result of each game which result is at least partially
20 random, wherein the length of time of one or more games or parts of games is monitored and the operation of the machine is altered in accordance with the monitored time.

According to the first aspect of the invention there is provided a gaming machine on which a game can
25 be played upon payment being made to the machine by the

player and in which the machine is arranged to make payments to the player at least sometimes according to the result of the game which result is at least partially random, wherein there are provided means
5 for monitoring the length of time of one or more games or parts of games and means for altering the operation of the machine in accordance with the monitored time.

The method and apparatus of the present invention thus take account of the time a player takes to play a game
10 or part of a game.

The alteration of the operation of the machine may be effective to adjust the average expected take per game of the machine, for example by altering the chance of a player obtaining a win in a game. "Average
15 expected" take per game is to be understood as referring to the average take per game that will be achieved over a period in which all random events occur at exactly the frequency that is to be expected. In a case where a player's skill can affect the take, then the average
20 expected take per game will be specific to the player playing the machine and if that player is replaced by another player of different skill without the operation of the machine being altered the average expected take per game will change.

25 The alteration of the operation of the machine may have any of a number of effects. For example the alteration may be such as to tend to maintain at a

desired level the rate of take of the machine. For the purposes of this specification, "rate of take" is defined as the take per unit playing time. Playing time excludes time when the machine is idle awaiting receipt
5 of a payment to enable a game to begin and may also exclude other time, for example time between receipt of a payment to enable a player to begin a game and actual commencement of the game by the player, for example by pushing a start button. The rate of take may be
10 maintained at a desired value by adjusting the average expected take per game of the machine, or by altering the duration of a game.

As already explained above there already exist machines in which the average expected take per game is
15 altered in order to tend to maintain a steady short term average actual take per game. In such a machine there is already a control system for altering the average expected take per game according to the average actual take per game and it is therefore convenient to provide
20 a machine according to the present invention simply by adding a further control system which further alters the average expected take per game, for example by adjusting a desired value within the first control system, in accordance with the monitored time in order to control
25 the rate of take of the machine.

The alteration of the operation of the machine may be such as to tend to maintain at a desired value

the rate of paying out of the machine. For the purposes of this specification, the "rate of paying out" is defined as the value of payments made to a player by the machine per unit playing time. In a case where the
5 length of a game does not vary by a significant amount in at least the medium term, the game time provides an indication of the value of payments paid into the machine and therefore control of the rate of paying out will approximately control the rate of take of the
10 machine. In such a case there is no need to monitor the payments made to the machine by a player.

While reference is made above to altering the operation of the machine such as to tend to maintain at a desired value a certain variable, it should be understood
15 that such a desired value may not be fixed throughout the life of the machine. In particular the operator of the machine may be able to adjust manually the desired value to one that he considers appropriate to his circumstances. Also, the machine may be arranged such
20 that the operation of the machine is only altered if a monitored variable, for example the rate of take, falls below a certain level, no adjustment being made should the rate of take rise above that level.

The alteration of the operation of the machine
25 may take account of events that have occurred throughout the entire life of the machine in order for example that the rate of take of the machine average a desired amount

during the machine's life, or it may take account only of events over a more recent period such as a given number of games or a given number of hours of playing time.

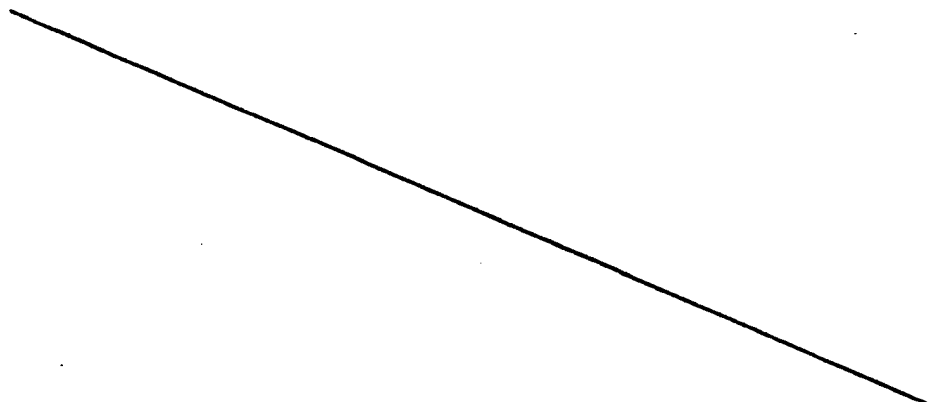
The possibility of alteration of the operation of
5 the machine may be considered at the end of each game or at any time during a game. In this case the machine is continually adjusted to provide the desired overall pattern of operation.

There are a number of ways in which the altera-
10 tion of the operation of the machine may be effected. Most conveniently the chance of a payment being made by the machine in a game is altered. Other possibilities, however, are to alter the value of payments made by the machine to a player, the value of payments made per game
15 by a player to the machine, or to alter the average duration of a game, for example by altering the time for which reels in the machine spin. A combination of these methods may be used. In the case where the chance of payment by the machine being made is altered, this may
20 be done in a variety of ways: it may for example involve directly altering the chance of a given event occurring or it may involve indirectly altering such chance, for example by adjusting the degree of control which a player is able to exercise over the machine.

25 The machine may have a plurality of discrete modes of operation and the operation of the machine may be altered by switching from one discrete mode to

another. In the simplest form of such an arrangement, a machine might have two modes of operation, one of which would tend to favour the player more than would be desired in the long term and the other of which would disadvantage the player to a greater extent than would be desired in the long term. Thus by switching between the two modes of operation the desired overall result could be achieved. Preferably there will be more than two modes of operation enabling a somewhat gentler adjustment of the machine to be made. It is also possible to arrange for the mode of operation of the machine to be continuously variable.

References have been made to "payments". Such payments, which may physically be paid in or out at the beginning or end (or indeed some other stage) of the game to which they relate or may be stored in the machine for subsequent paying in or out, will normally be in the form of coins or tokens but it will be appreciated that they may take other forms as



well; for example payments made by the machine may include prizes other than cash and payments made to or by the machine may simply be credits or debits on an account. The last possibility is most likely to apply
5 in the case where a gaming machine is operated by a credit card.

It is possible that due to a malfunction, which may for example be caused by tampering, the machine's take diverges widely from that which is desired. In
10 that case it may be desirable to limit the corrective action taken by the machine in a subsequent game. Thus upper and lower limits may be set for the time of a game and/or for the chance of receiving a payment by the machine and/or for other factors that may be varied.

15 The operation of the machine may also be altered according to the time at which the machine is being operated. Reference to "time" here is to be understood as referring to time of day, week or year or the like. There may be periods in the day or week when a machine is
20 used relatively little and it may be desirable to operate the machine somewhat differently during such a period, for example by reducing the take per game or per unit playing time. Indeed this feature of altering the operation of the machine according to the time at which

the machine is being operated may be useful even in a case where the operation of the machine is not altered in accordance with the length of time of one or more games or parts of games.

5 According to a second aspect of the invention there is provided a method of operating a gaming machine in which payments are made to the machine by a player in order to play games and in which payments are at least sometimes made to the player by the machine according to
10 the result of each game which result is at least partially random, wherein the time is monitored and the operation of the machine is altered according to the time at which the machine is being operated.

 According to the second aspect of the invention
15 there is also provided a gaming machine on which a game can be played upon payment being made to the machine by the player and in which the machine is arranged to make payments to the player at least sometimes according to the result of the game which result is at least partially
20 random, wherein there are provided calendar means for monitoring the time at which the machine is being operated and means for altering the operation of the machine in accordance with an input from the calendar means.

25 It will be appreciated from the description above that gaming machine may be operated in a wide variety of ways within the scope of the invention. The

technology required to implement any of the various methods and apparatus described above will be well known to those skilled in the art. At the present time it would be most common for the control system to be an
5 electronic system but it should be understood that a mechanical control system is also within the scope of the invention.

By way of example one particular embodiment of the invention will now be described. A relatively
10 simple example has deliberately been taken in order to simplify the description and make the effect of the invention in this example clear.

The particular embodiment comprises a simple three reel microprocessor controlled fruit machine having
15 ing a hold after win feature. The machine accepts coins of only one value, namely the price of a game, and is arranged so that a coin will only be accepted when no game is in progress. A player inserts a coin into the machine and is then able to operate the machine by
20 pushing a start button. When the start button is pushed the three reels are spun through separate random displacements. When all the reels have stopped, the machine examines the symbols displayed to the player on the win line and, if there is a winning combination,

pays out the appropriate amount. Upon the insertion of a further coin the machine will decide randomly and indicate to the player, for example by lighting one or more lamps, whether the reels may be held (prevented
5 from spinning) in the following game. Sometimes a player will be allowed to hold all three reels of a winning combination in the following game, thereby guaranteeing another win when the next game is played. All these operations are controlled by the machine's
10 microprocessor.

The microprocessor includes two stores: in one store the actual take of the machine is stored, amounts being added to the store every time a player inserts a coin to release the start button and amounts
15 being subtracted from the store every time the machine makes a payment to the player, the amount added or subtracted representing the value of the payment; in the other store the accumulated playing time is stored, the playing time in this example being, for each game, the
20 time from which a player inserts a coin until the time at which a losing combination is displayed on the winning line or the payment of an amount to a player completed. In order to compute the playing time the microprocessor is connected to a clock/calendar means
25 which provides an accurate source of clock pulses.

In the particular embodiment described the operation of the machine is altered in such a way as to provide a desired rate of take. At the end of a game the control system ascertains the actual take
5 from one store and also calculates what the value for the take at the desired rate of take would be (by multiplying the accumulated playing time in the other store by the value of the desired rate of take which is stored in the control system). The machine then
10 selects a mode of operation for the next game in dependence upon the result of the comparison of the actual take and the desired take. In the particular example described, the machine has two modes of operation: in a first mode the hold after win feature
15 is available relatively more often and consequently the actual rate of take will average substantially less than the desired rate of take, while in a second mode the hold after win feature is available relatively less often and consequently the actual rate of take
20 will average substantially more than the desired rate of take. As will be understood if the machine finds after a game that the actual rate of take is greater than the desired rate of take then the control system will select the first mode of operation for the next

game while if the actual rate of take is less than the desired rate of take then the control system will select the second mode of operation for the next game.

While it is within the scope of the invention
5 for there to be one fixed desired rate of take, in the described example the value of the desired rate of take is adjusted by the machine according to the time at which the machine is operated. The clock/calendar means monitors the time and may be arranged to adjust the
10 desired rate of take according to the time of day, and/or the day of the week and/or according to particular days such as public holidays in order to set a higher or lower desired rate of take during particular periods.

In the embodiment described there will be
15 relatively little variation in the duration of each game. However in more sophisticated machines, for example those having a "nudge" facility there may be a considerable variation in the duration of each game. In the described embodiment playing time is computed from
20 the moment a coin is inserted but it may instead be computed from the moment the start button is pushed.

Claims:

1. A method of operating a gaming machine in which a payment is made to the machine by a player in order to play a game and in which payments are at least sometimes
5 made to the player by the machine according to the result of the game which result is at least partially random, wherein the length of time of one or more games or parts of games is monitored and the operation of the machine is altered in accordance with the monitored time.
- 10 2. A method according to claim 1 in which the alteration of the operation of the machine is effective to adjust the average expected take per game.
3. A method according to claim 1 or claim 2 in which the alteration of the operation of the machine is
15 such as to tend to maintain at a desired level the rate of take of the machine.
4. A method according to claim 1 or claim 2 in which the alteration of the operation of the machine is such as to tend to maintain at a desired value the rate
20 of paying out of the machine.
5. A method according to any preceding claim in which the alteration of the operation of the machine is effected by altering the chance of a payment being made by the machine.
- 25 6. A method according to any preceding claim in which the alteration of the operation of the machine is effected by altering the value of payments made per game

by a player to the machine.

7. A method according to any preceding claim in which the alteration of the operation of the machine is effected by altering the average duration of a game.

5 8. A method according to any preceding claim in which the alteration of the operation of the machine comprises adjusting the degree of control a player is able to exercise over the machine.

9. A method according to any preceding claim in
10 which the machine has a plurality of discrete modes of operation and the operation of the machine is altered by switching from one discrete mode to another.

10. A method according to any of claims 1 to 8 in which the mode of operation of the machine is
15 continuously variable.

11. A method according to any preceding claim in which the operation of the machine is also altered according to the time at which the machine is being operated.

20 12. A method of operating a gaming machine in which payments are made to the machine by a player in order to play games and in which payments are at least sometimes made to the player by the machine according to the result of each game which result is at least partially
25 random, wherein the time is monitored and the operation of the machine is altered according to the time at which the machine is being operated.

13. A method of operating a gaming machine substantially as herein described.

14. A gaming machine on which a game can be played upon payment being made to the machine by the player and
5 in which the machine is arranged to make payments to the player at least sometimes according to the result of the game which result is at least partially random, wherein there are provided means for monitoring the length of time of one or more games or parts of games
10 and means for altering the operation of the machine in accordance with the monitored time.

15. A gaming machine according to claim 14, wherein the means for altering the operation of the machine is effective to adjust the average expected take per game of
15 the machine.

16. A gaming machine according to claim 14 or claim 15 in which the machine is arranged such that the rate of take of the machine tends towards a desired level.

20 17. A gaming machine according to any of claims 14 to 16 in which the machine is arranged such that the rate of paying out of the machine tends towards a desired value.

18. A gaming machine according to any of claims
25 14 to 17 wherein the means for altering the operation of the machine includes means for altering the chance of a payment being made by the machine.

19. A gaming machine according to any of claims 14 to 18 wherein the means for altering the operation of the machine includes means for altering the value of payments made per game by a player to the machine.

5 20. A gaming machine according to any of claims 14 to 18 wherein the means for altering the operation of the machine includes means for altering the average duration of a game.

21. A gaming machine according to any of claims
10 14 to 20 wherein the means for altering the operation of the machine includes means for adjusting the degree of control a player is able to exercise over the machine.

22. A gaming machine according to any of claims
15 14 to 21 wherein the machine has a plurality of discrete modes of operation and the means for altering the operation of the machine includes means for switching from one mode to another.

23. A gaming machine according to any of claims 14 to
20 21 wherein the mode of operation of the machine is continuously variable and the means for altering the operation of the machine includes means for varying the mode of operation of the machine.

24. A gaming machine according to any of claims 14
25 to 23 further including calendar means for monitoring the time at which the machine is being operated, in which the means for altering the operation of the

machine is connected to receive an input from the calendar means.

25. A gaming machine on which a game can be played upon payment being made to the machine by the player
5 and in which the machine is arranged to make payments to the player at least sometimes according to the result of the game which result is at least partially random, wherein there are provided calendar means for monitoring the time at which the machine is being
10 operated and means for altering the operation of the machine in accordance with an input from the calendar means.

26. A gaming machine substantially as herein described.